



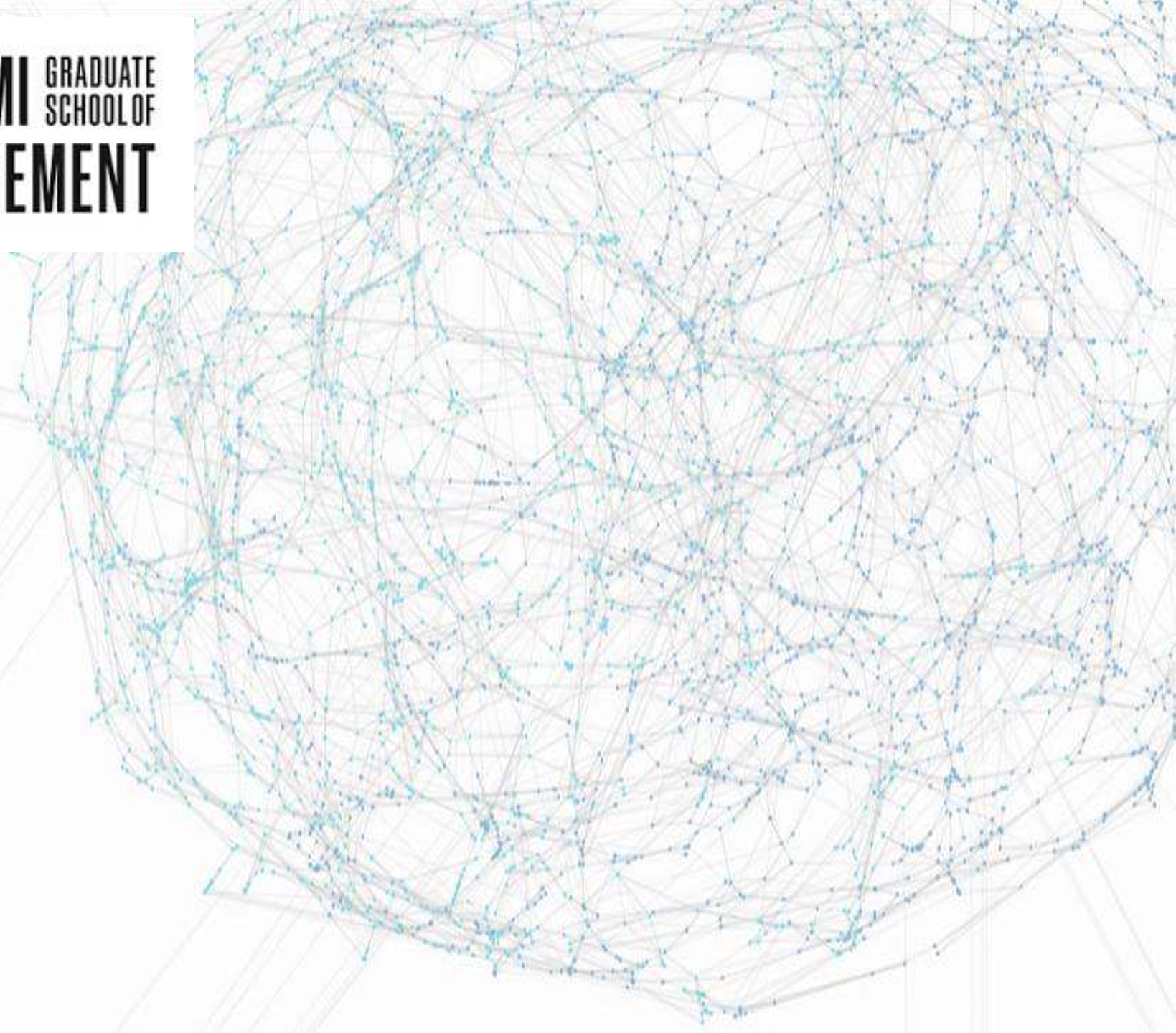
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From data to sustainable value

POLIMI GRADUATE
SCHOOL OF
MANAGEMENT

Open Innovation and AI

November 7th 2023





intellico Introduction to Lorenzo Tencati

From data to sustainable value



Lorenzo Tencati

Lorenzo is a serial **entrepreneur, investor** and strategy **advisor** with a **tech** bias (focusing on AI)

Lorenzo started his career at **Bain & Company** in Europe and obtained his MBA from **London Business School**

Lorenzo is a **YPO member** since 2014 and has been working across **Europe** and **Africa** over the last decade. He is a **Lecturer at MIP Politecnico di Milano**

 **Singular**



Tech-focused global strategy and investment consulting firm

- Offices in Johannesburg, Zug, Munich, Milan



Impact investing, with a **Tech bias** (www.seon.group, www.Intellico.ai, ...)

- Offices in Italy and Switzerland

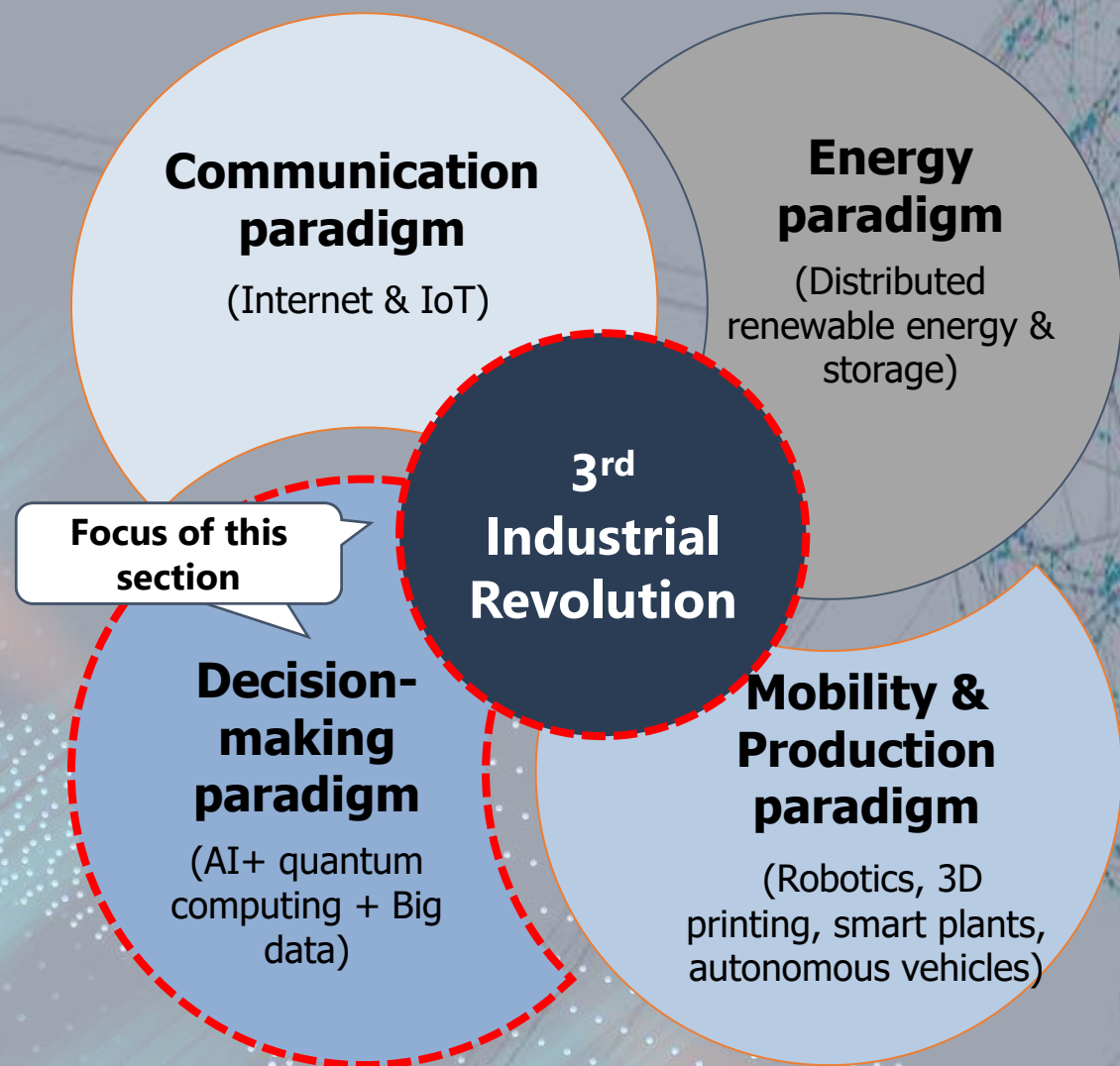


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From data to sustainable value

Revolutionizing human decision making with Explainable AI





1st Industrial Revolution: *1760s, born in the UK*

- Communication: **Telegraph**
- Energy: **Coal**
- Mobility & Production: **Locomotive & steam engine**
- Decision making: **Human**

2nd Industrial Revolution: *1860s, born in the US*

- Communication: **Telephone, radio**
- Energy: **Oil**
- Mobility & Production: **Cars, trucks & planes**
- Decision making: **Human**

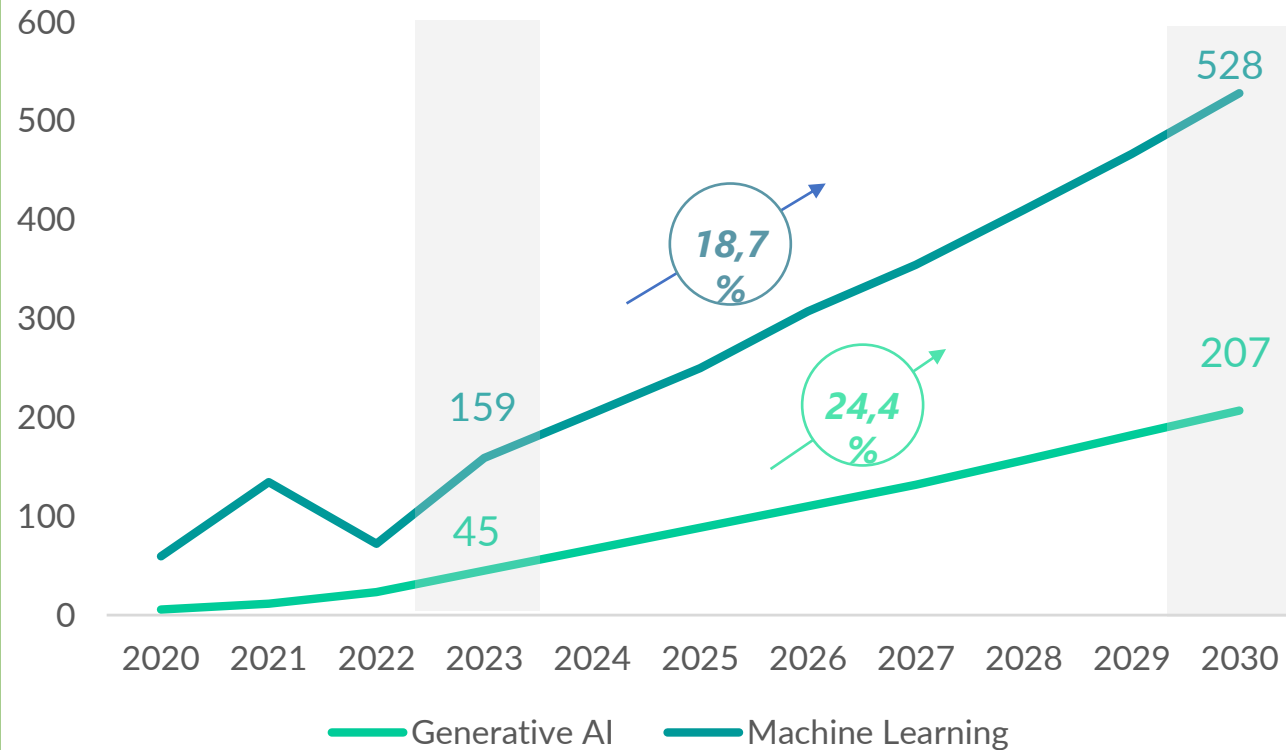
3rd Industrial Revolution: *2010s, born in the US*

- Communication: **Internet/ IoT**
- Energy: **Distributed renewables**
- Mobility & Production: **Autonomous vehicles & plants**
- Decision making: **AI + Human**



THE MARKET OPPORTUNITY

Artificial Intelligence Market size (USD Billion) Generative AI vs Machine Learning



 CAGR 23-30



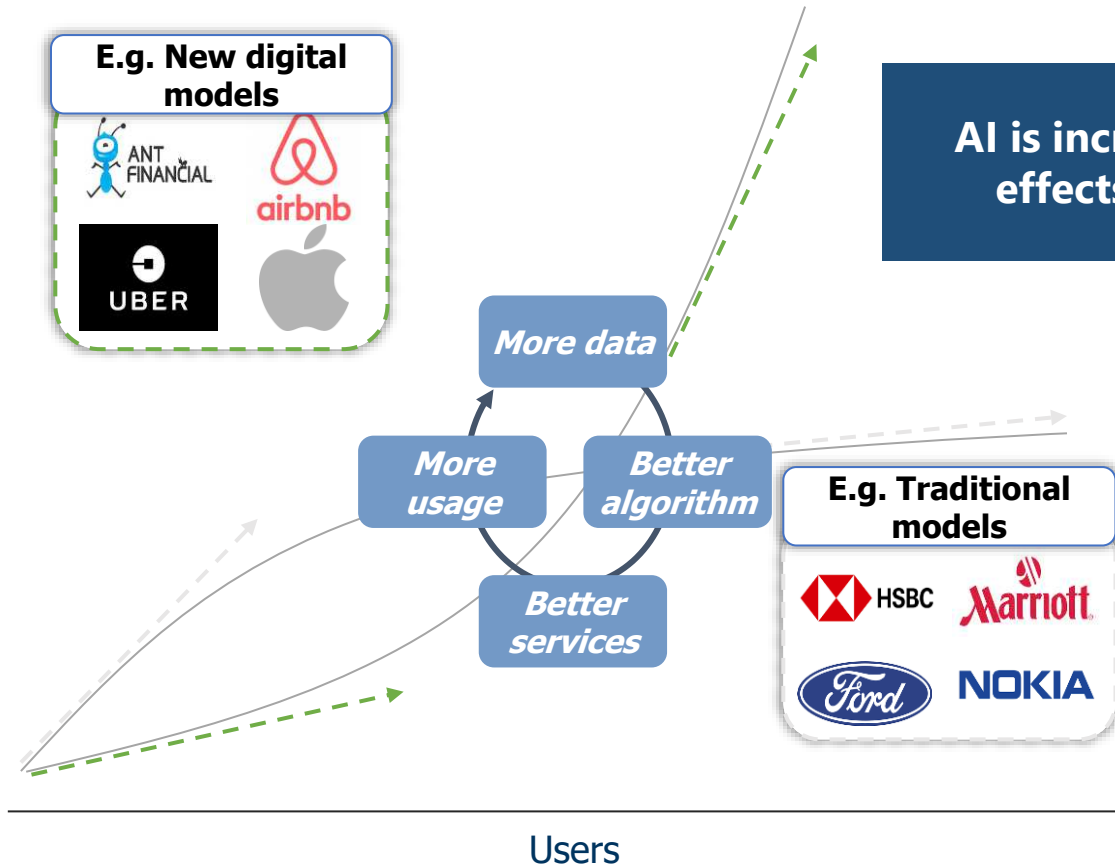
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From data to sustainable value

The Winners at the “Innovation Game” are winning FAST and BIG

Digital models have “data network effects” on their side

Value and number of users of digital vs tradition business models



AI is increasing these effects massively

THE NEW TECH STACK: MAKE, BUY OR PARTNER?

MACHINE INTELLIGENCE 3.0

VISUAL

- Orbital Insight
- Planet
- clarifai
- DEEP VISION
- cortica
- Igoclon
- SPACE_KNOW
- Captricity
- netra
- deepomatic

AUDIO

- Gridspace
- TalkIQ
- nexidia
- twilio
- CAPIO
- Expect Labs
- Clover
- Mobvo
- QuirousAI
- popMP archive

SENSOR

- PREDIX
- IoT
- MAANA
- Sentenai
- PLANET OS
- UPTAKE
- IMUBIT
- Perceptics
- thingworx
- KONUX
- Alluvium

INTERNAL DATA

- PRIMER
- IBM WATSON
- Cyberp
- Palantir
- ARIMO
- Alation
- Sapho
- Outlier
- Digital Reasoning

MARKET

- mattermark
- Quid
- Datafox
- PREMISE
- Bottlenose
- MOTIVA
- enigma
- CB INSIGHTS
- Tracxn
- predata

CUSTOMER SUPPORT

- DigitalGenius
- Kasisto
- ACTIONIQ
- Wiseio
- zendesk
- Preact
- CLARABRIDGE

SALES

- collective[i]
- sense
- fuse|machines
- AVISO
- salesforce
- INSIDE SALES.COM
- clari
- Zensight

MARKETING

- MINTIGO
- Lattice
- RADIUS
- LiftIgniter
- PERSADO
- brightlumen
- retention
- MOTIVA
- COGNICOR
- AIRPR
- magai

SECURITY

- CYCLANCE
- DARKTRACE
- ZIMPERIUM
- deepinstinct
- Sentinel
- DEMISTO
- graphistry
- drawbridge
- SignalSense
- AppZen

RECRUITING

- textio
- entelo
- Wade & Wendy
- hi
- unitive
- SpringRole
- GIGSTER
- HireVue

GROUND NAVIGATION

- drive.ai
- AdasWorks
- ZOOX
- MOBILEYE
- UBER
- Google
- TESLA
- Autonomy
- Auro Robotics

AERIAL

- SKYDIO
- SHIELD AI
- Airware
- DJI
- LILY
- DroneDeploy
- pilot.ai
- SKYCATCH

INDUSTRIAL

- JAYBRIDGE
- OSARO
- CLEARPATH
- fetch
- KINDRED
- HARVEST
- rethink robotics

PERSONAL

- amazon alexa
- Cortana
- Allo
- facebook
- Siri
- Replika

PROFESSIONAL

- butter.ai
- pogo
- SKIPFLAG
- clara
- x.ai
- slack
- talla
- Zoom
- sudo

AGRICULTURE

- BLUE RIVER
- MAVIX
- tule
- TRACE
- Pivot Bio
- Terraviva
- AGRI-DATA
- Descartes Labs
- udlo
- Arvest

EDUCATION

- KNEWTON
- volley
- gradescope
- CTI
- coursera
- UDACITY
- alt school

INVESTMENT

- Bloomberg
- sentient
- SENTIUM
- KENSHO
- alpha sense
- Dataminr
- CEREBELLUM CAPITAL
- Quandl

LEGAL

- blue J
- BEAGLE
- Everlaw
- RAVEL
- seal
- ROSS
- LEGAL ROBOT

LOGISTICS

- NAUTO
- Acerta
- PRETECKT
- Routific
- clearmetal
- MARBLE
- PITSTOP

MATERIALS

- zymergen
- Citrine
- Eigen Innovations
- SIGHT MACHINE
- SINKO
- BIOWORKS
- nanotronics
- CALCULARIO

RETAIL FINANCE

- TALA
- zebra finance
- Lendo
- earnest
- affirm
- MIRADOR
- wealthfront
- Betterment

PATIENT

- PULSE
- CareSkore
- ZEPHYR HEALTH
- EM
- Watson Health
- OncOx
- SENTRIAN
- Atomwise
- Numerate

IMAGE

- BUTTERFLY
- 3SCAN
- ARTERYS
- enlitic
- BAYLABS
- imago
- Google DeepMind

BIOLOGICAL

- iCarbonX
- color
- GRAIL
- deep genomics
- RECURSION
- LUMINIST
- Numerate
- Atomwise
- verily
- WHOLE
- BIOPHE

TECHNOLOGY STACK

AGENT ENABLERS

- OCTANE.AI
- howdy
- Maluuba
- KITT.AI
- OpenAI Gym
- Kasisto
- AUTOMAT
- semantic machines

DATA SCIENCE

- DOMINO
- SPARKBEYOND
- rapidminer
- kaggle
- DataRobot
- yhat
- AYASDI
- data iku
- seldon
- yseop
- bigm

MACHINE LEARNING

- CognitiveScale
- GoogleML
- context
- relevant
- Cyberp
- HyperScience
- NOLOGICS
- minds.ai
- H2O.ai
- SCALED INFERENCE
- sparkcognition
- loop
- GEOMETRIC INTELLIGENCE
- deepsense.io
- reactive
- skymind
- bonsai

NATURAL LANGUAGE

- agolo
- FLYLIEN
- LEXALYTICS
- Narrative Science
- loop
- spaCy
- LUMINOSO
- cortical.io
- MonkeyLearn

DEVELOPMENT

- SIGOPT
- HyperOpt
- fuzzyio
- pkite
- rainforest
- lobe
- Anodot
- Signifai
- LAYER 6
- bonsai

DATA CAPTURE

- CrowdFlower
- diffbot
- CrowdAI
- import
- Paxata
- DATASIFT
- amazon
- mechanicalturk
- enigma
- WorkFusion
- DATALOGUE
- TRIFACTA
- parsehub

OPEN SOURCE LIBRARIES

- Keras
- Chainer
- CNTK
- TensorFlow
- Caffe
- H2O
- DEEPLARNING4J
- theano
- torch
- DSSTNE
- scikit-learn
- AzureML
- neon
- MXNet
- DMTK
- Spark
- PaddlePaddle
- WEKA

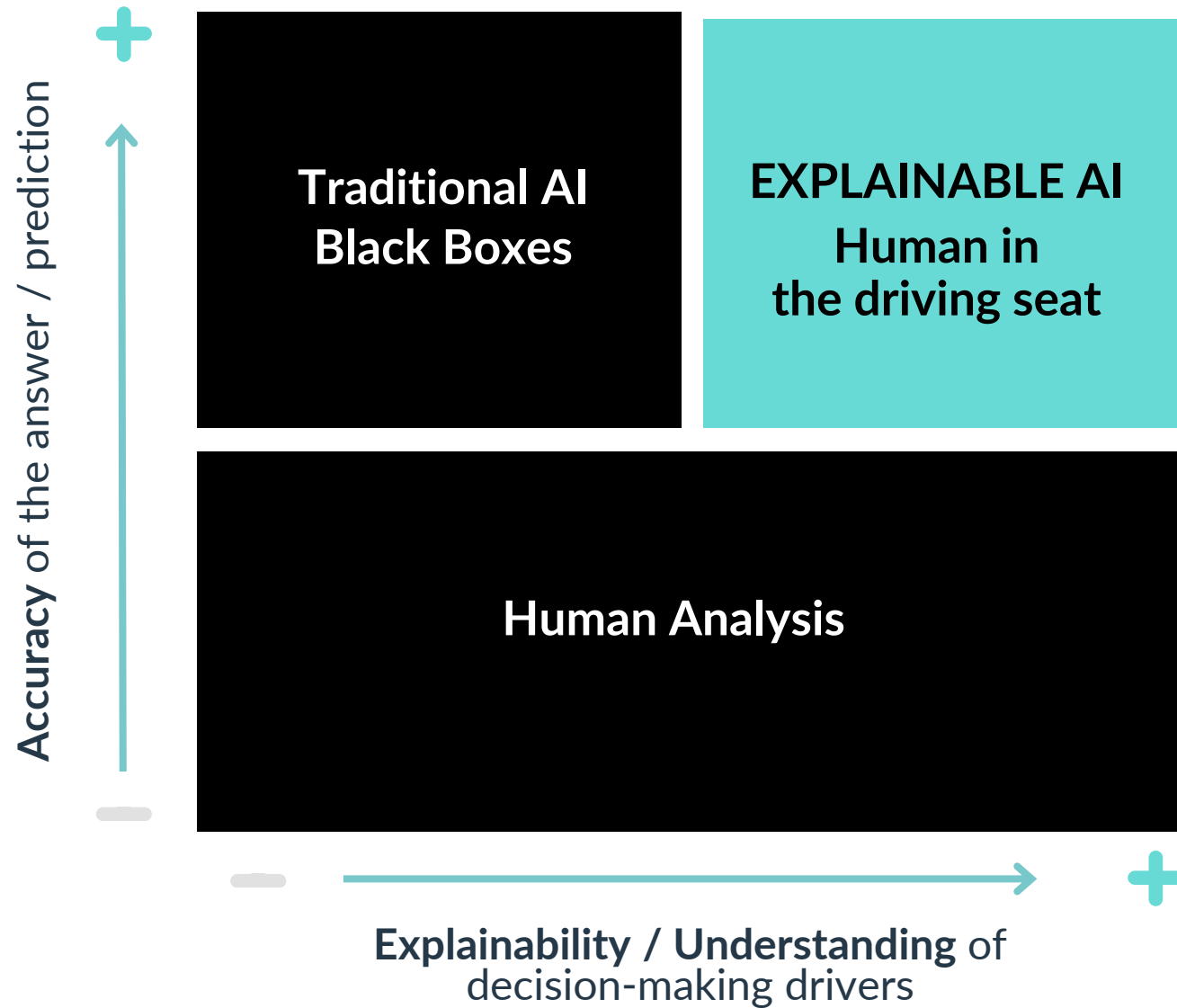
HARDWARE

- KNUPATH
- TENSTORRENT
- Cirrascale
- NVIDIA
- intel
- nervana
- Movidius
- tensilica
- GoogleTPU
- 10²⁴ Labs
- Qualcomm
- Cerebras
- Isosemi

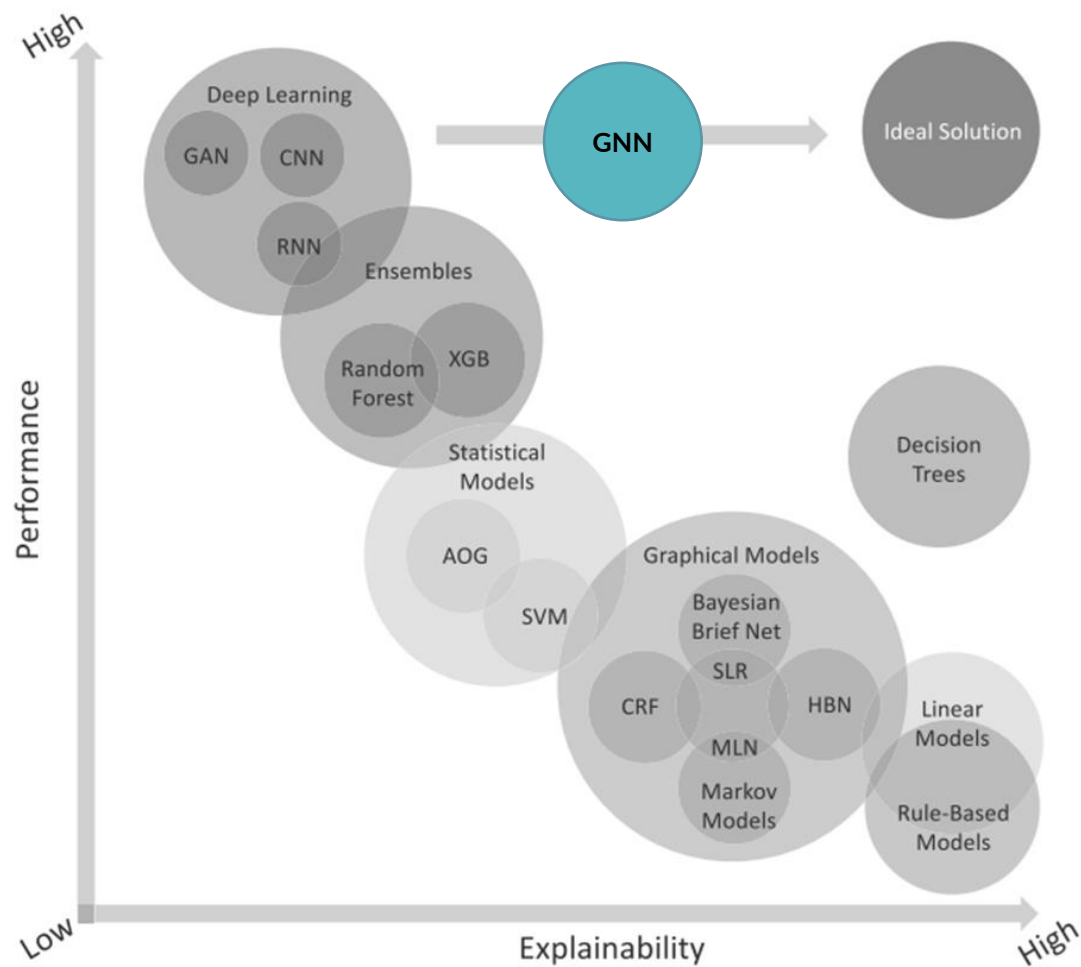
RESEARCH

- OpenAI
- masense
- ELEMENT
- vicarious
- KNOGGIN
- Numenta
- Kimera Systems
- Cogital

THE IMPERATIVE: KEEP HUMANS IN THE DRIVING SEAT



HOW TO KEEP HUMANS IN THE DRIVING SEAT?



Our research is yielding great results with:

- Knowledge graphs
- Physics-informed AI
- Graph Neural Networks
- Vertical LLMs

...

Source: Unbox the black-box for the medical explainable AI via multi-modal and multi-centre data fusion, 2021;

HAVE YOU EVER EXPERIENCED ...

REVENUES PRESSURE

Match your clients' taste and reduce the risk of losing revenues

REGULATORY PRESSURE

Be more sustainable and beware of blacklist components

SUPPLY CHAIN PRESSURE

Reduce production costs

FORMULATION TRIALS

From which recipe do we start with trial & error?

The guy who made it left last month. Shall we start all over again?!

How can our competitor obtain that taste with a lactose-free candy?

LABS TESTS

I can't possibly test all recipes combinations at the lab

The external lab says it cannot process it in 10 days

We changed the mix by 0,5% but the output properties changed dramatically

USER TEST

10 months to get here and sommeliers do not like it. What are the options now?

The users prefer a slightly different taste. And now?

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The screenshot displays the Intellico AI Simulator interface. At the top left, the 'matilde' logo is visible. The main area is titled 'Simulator (New Recipe Code: Trial 001)' and features a 'RUN THE SIMULATION' button. On the left, there is a list of ingredients with their respective values and lock icons. A 'DISTRIBUTE TO 100%' button is located above this list. The central part of the interface shows a 'Predictions' graph for 'Freshness' over time (0 to 40s), with a blue line fluctuating between approximately 750 and 2250. Below the graph is a 'Simulation Graph' showing a network of blue nodes connected by lines, with a 'Freshness' scale at the bottom ranging from 0.75 to 0.80. On the right side, there is a 'New Simulation' panel with fields for ID (00001), Label, and Status (Trial), and a 'SAVE NODE' button. Below this is an 'EXPLAIN THIS NODE' section with a sub-section for 'Ingredients' containing a table of ingredients and their values.

Key	Value
Sugar	0.12
Butter	0.02
Mint	0.55
Cocoa	0.25
Anise	0.1
Vanilla	0.01
Honey	0.05

EXAMPLE

OUR CASE STUDY IN FOOD

INPUT: Existing formulation ingredients mix to be adjusted (e.g., replacing costly ingredients)

OUTPUT: Predicted variable value (e.g., Freshness over time) based on the ingredient mix



OPTIMIZER



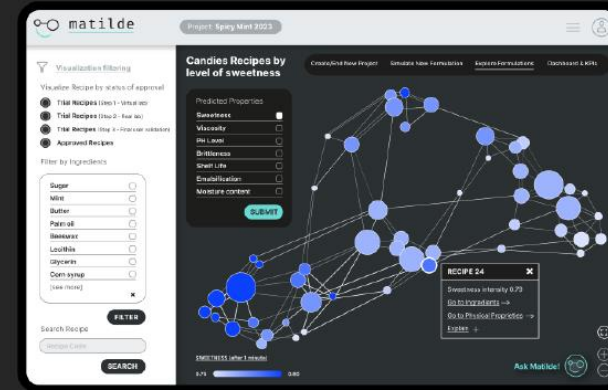
Simulate and optimize trials virtually before of getting in real Lab

EXPLAINER



Understand the root causes behind your results

EXPLORER



Explore all the possibilities and turn your past experiences into knowledge

MARKET REQUEST

Improve «precision» of dies with high-level design without impacting on delivering time

INVOLVED RESOURCES

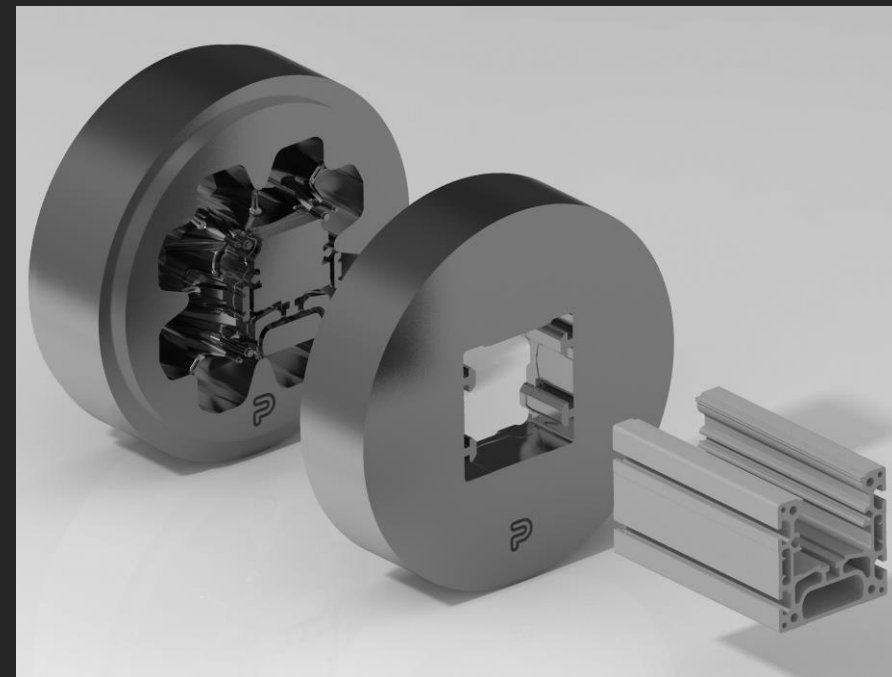
200+ CAD designers (~40 in Verdello)

CHALLENGES

- Barriers to exploit projects archive: **computational impossibility** to query the archive of 200k+ past projects
- **Impossibility to provide** a complete description of **all the details** that are encompass in an image

→ **Low historical re-use of past projects (<20%)**

HOW TO EFFECTLY IDENTIFY SIMILAR IMAGES/PROJECTS THAT CAN BE REUSE?



LET'S SEE THE IMAGE SIMILARITY IN ACTION

A

Input customer requirements (images, CAD design, size, material, and other technical characteristics).

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Profili Simili

Ricerca Profilo

CARICA PROFILO 20616203G.jpg

Diametro Utile

Numero Cuori Per Luce 7

Numero Luci

Anno

SEARCH

Codice Comessa 20616203
Codice Progetto 40CR3ESH

Codice Comessa 20374384
Codice Progetto 47NR9L4H

Codice Comessa 20519218
Codice Progetto 56BR101H

Codice Comessa 20128284

Codice Comessa 20135674

Codice Comessa 20138208

B

Return the list of the 20/30 most similar projects

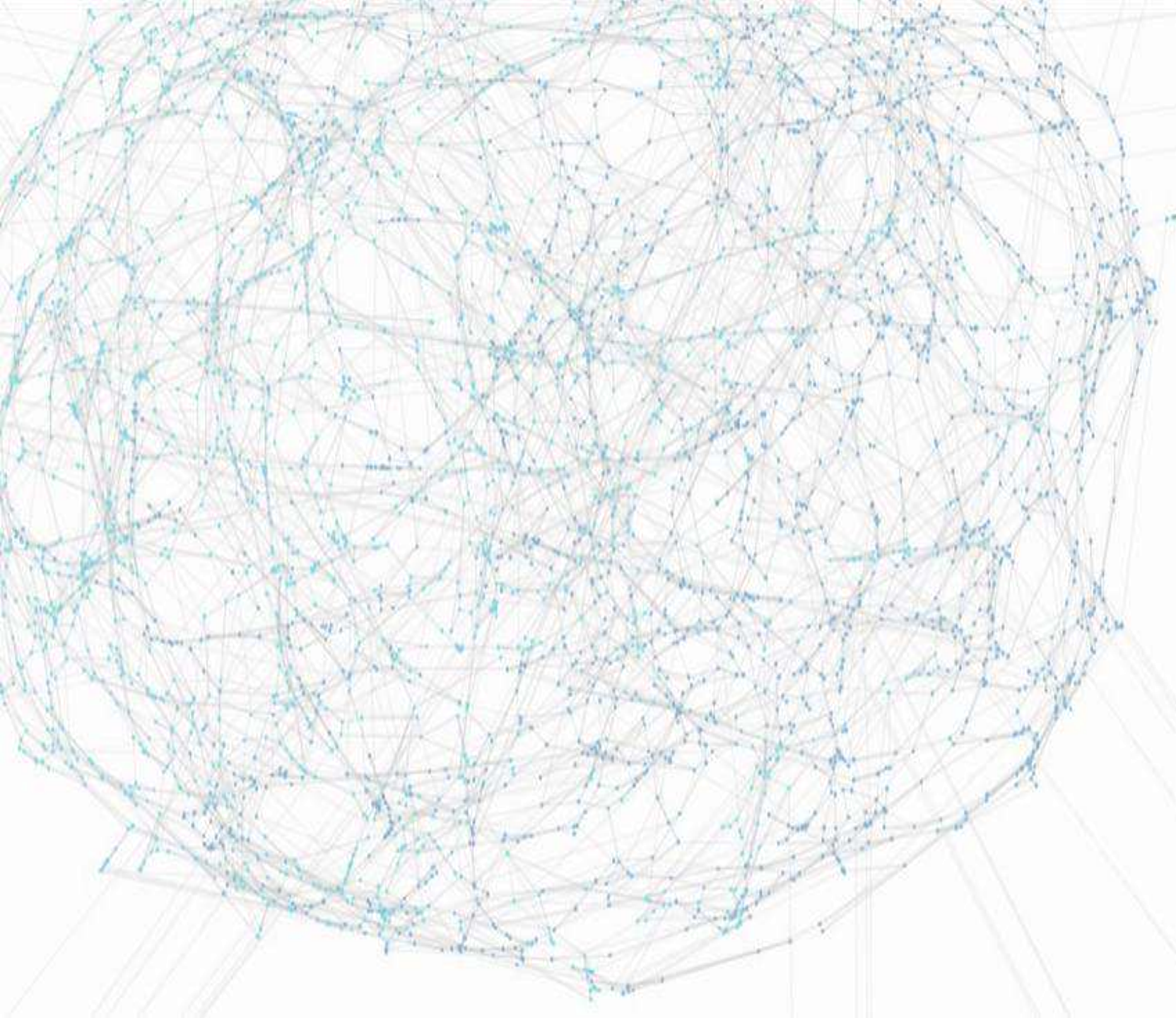
C

Possibility to access to profiles with similar details

Feedback collection for improvements

D

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intellico

The Data-to-value AI Factory



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